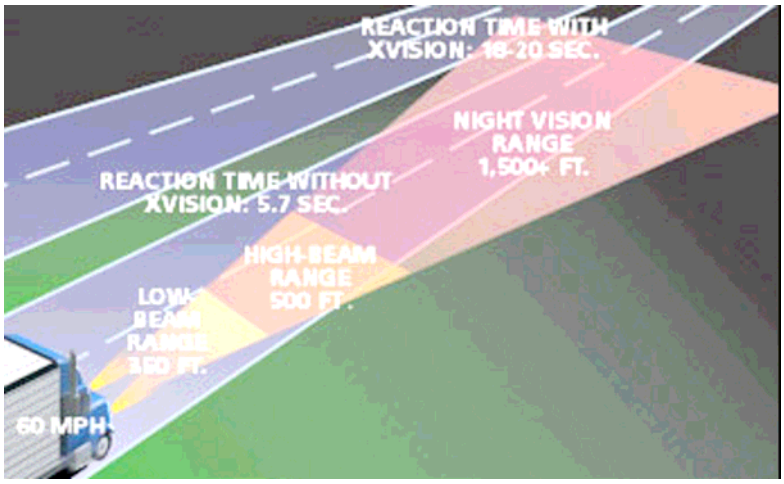
RESEARCH IMPLEMENTATION REPORT — 2004



ARIZONA TRANSPORTATION RESEARCH CENTER

MARCH 2005

Arizona Department of Transportation

Welcome

Implementation is an essential element of a successful transportation research program. The Arizona Transportation Research Center (ATRC) monitors implementation associated with research completed under the ATRC program. In some cases research implementation takes place over several years. This report documents implementation that occurred during calendar year 2004.

The research program is focused on applied transportation research. As such, the principal measure of its success is the extent to which research results are carried out. Implementation of research can take many forms, from assisting decision-makers to improved methods, materials and practices. Research implemented during 2004 included environmental studies, Intelligent Transportation System improvements, and a range of policy, procedure and communication benefits.

To gain the greatest value from the research performed it is important to evaluate and learn from the results of the research. This maximizes the benefits of completed research and improves the selection and design of future research efforts. ATRC staff monitor the implementation of all completed research projects. While formal monitoring processes are not currently used, implementation monitoring can occur over several years for a single project. We hope to improve the research program through the feedback gathered during implementation monitoring

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About the Arizona Transportation Research Center

The Arizona Department of Transportation (ADOT) conducts research on a wide range of transportation topics. The Department's research effort is administered by the Arizona Transportation Research Center (ATRC), which has immediate responsibility for the management and conduct of research. During 2004 the ATRC research program was guided by the Research Council, which provided direction on research priorities. The research Steering Committee provides policy guidance for the total research effort.

The Arizona Transportation Research Center is located at 2739 East Washington Street, Phoenix, Arizona.

ATRC STAFF

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ATRC manages the ADOT transportation research program, including conducting in-house research, coordinates the ADOT product evaluation program, houses and operates the ATRC Library, and provides direct financial support for ADOT's Local Technical Assistance Program (LTAP).

Each year ATRC solicits research proposals throughout ADOT and the transportation community. In meetings with individual offices or in Department-wide needs assessment meetings, ADOT personnel are asked to suggest research pertinent to their areas. ATRC also invites suggestions from academia, consultants, and industry.

Research suggestions are solicited through personal contact, newsletters, electronic communications, and the Internet.

The ATRC research program is currently grouped into seven emphasis areas. These areas are:

- Environment
- Intelligent Transportation Systems (ITS)
- Maintenance
- Materials and Construction
- Planning and Administration (including Motor Vehicles, and Information Technology)
- Structures
- Traffic and Safety

New projects are assigned to one of these areas. A project manager is assigned to each project. Technical advisory committees are formed for each project to work with the project manager on developing work scopes, reviewing and guiding the progress of the research, and reviewing the final report.

Small Budget Projects

The Arizona Transportation Research Center integrates opportunities for university students and small consulting firms into its research program. Each year ATRC allocates up to $100,000 for small budget projects ($15,000 or less) that often provide opportunities to contract university students and small consulting firms for transportation research. ATRC enthusiastically encourages future transportation professionals and small business. This strategy provides opportunities for individuals to learn first hand about the role of research and technology in the Nation's transportation system, and the variety of available transportation career or business options. The results have been high quality research that makes effective use of the ATRC research budget while providing valuable professional experience for students and small businesses.

Research Implementation

Implementation may range from assisting an entity in making a decision, to a change in operational strategies or activities. Implementation of research results often occurs over a period of several years. As such, implementation that occurred during 2004 will be addressed in this report, including actions associated with projects completed prior to 2004. The discussion is grouped by research emphasis area.

Implementation during 2004 includes development of training programs, modifying ITS technology, modifying administrative processes and better marketing ADOT products and services. The study on fugitive dust emissions (SPR-519), completed in 2003, led to training sessions for contractors in 2004. Project SPR-543 provided the basis for a review of ADOT's environmental stewardship. A variety of enhancements to deployed ITS systems and operating practices were enabled through projects SPR-473, SPR-562, and SPR 570. Projects SPR-548 and SPR-563 developed strategies for dealing specific with the Motor Vehicle Division issues. Improved methods of communicating with the public during construction were the result of project SPR-560. The highly successful ADOT publication, *Arizona Highways*, benefited from the results of project SPR-568 which evaluated the magazine's impact on tourism in Arizona.

Completed Projects

During calendar year 2004, 17 research projects were completed under ATRC management. (Appendix A includes a list of these projects.) All these projects are examples of applied research. As such, implementation of the research results is the ultimate measure of the success of the research.

Knowledge is not achieved until shared.

ENVIRONMENT

SPR-519, *PM-10 Research for Dust Mitigation*

Project Cost: $150,000

Summary: More than 3 million persons reside in Maricopa County, Arizona, one of the fastest growing urban areas in the country. The urbanized portion of the county has been designated a non-attainment area for PM10 (particulates up to 10 microns in diameter), by the U.S. Environmental Protection Agency for levels of particulate matter that exceed the National Ambient Air Quality Standards. In response, Maricopa County has enacted Rule 310 that contains measures to mitigate the generation of fugitive dust. Construction activities are estimated to generate nearly 40 percent of airborne particulates in the area. The Arizona Department of Transportation contracted with Lima & Associates and Cathy D. Arthur to develop an educational outreach program with the purpose of training construction industry personnel on the importance of controlling fugitive dust and the methods of so doing. This report summarizes the background leading up to the enactment of Rule 310 and the subsequent development of the outreach program. Elements of the program are described, and an implementation plan is provided. This report is accompanied by appendices that contain prototype elements of the training program that have been developed. These prototypes are intended to illustrate the results of the research only, and are not current training instruments.

Implementation: The final research project report was published October 2003. This project developed an educational outreach and certification program for the Maricopa County PM10 non-attainment area. The outreach program is intended for educational use statewide. The ADOT Transportation Planning Division (TPD) Air Quality Programs section worked with the consultants to finalize a training package. The logo "Blue Skies Training Program" was adopted for this training. On June 11th, 2004 the first training session was conducted and was very successful. Another session was held late 2004 in Pinal County. There are plans to implement an online training package—presently in the early stages of development. In the meantime, the training material is available on the TPD/Air Quality web site. (http://tpd.azdot.gov/air/index.htm) Related information is also available at the site.

SPR-543, *Strategies to Integrate Environmental Stewardship into ADOT's Business*

Project Cost: $100,000

Summary: ADOT has identified environmental stewardship as one of three priority focus areas for the department. The research was directed toward facilitating ADOT's environmental stewardship role. Overarching environmental performance improvement opportunities and strategies were identified in 13 environmental performance areas to improve ADOT's overall environmental performance and stewardship. Organization-specific environmental performance improvement opportunities were identified for each of the nine organizations.

Implementation: The project report was published October 2004. Earlier in the year the project technical advisory committee reviewed the many recommendations and developed a matrix of key issues for the agency to explore based on those recommendations. ADOT executive management immediately put together an implementation committee to determine ways that the agency can proceed with implementation. This committee is meeting regularly under the watch of Sonya Herrera, Health & Safety Administrator. Transportation Planning Division director Dale Buskirk and State Engineer Michael Ortega are both working closely with the team.

INTELLIGENT TRANSPORTATION SYSTEMS

SPR-473, *Arizona Intelligent Vehicle Research*

Project Cost: $295,000

Summary: Arizona has a strong commitment to research in Intelligent Transportation Systems (ITS) vehicle technologies. This Intelligent Vehicles project was the result of ADOT visits to the National Automated Highway Systems (AHS) Program Demonstration in San Diego, California in 1997. The ultimate, practical basis for this project became Intelligent Vehicle research to enhance travel safety and operational efficiency, and the primary focus is winter maintenance. In 1998, ADOT joined the California Department of Transportation and the University of California to evaluate a prototype ASP (Advanced Snowplow) vehicle, the Caltrans RoadView system. Two years later, ADOT added a 3M Lane Awareness System to the research program to evaluate along with the Caltrans technologies. After four years, due to cost constraints, the research program shifted from infrastructure-based to on-board warning systems. Seven routes were selected to test infrared night vision and microwave radar collision warning systems.

Implementation: The research program in 2002-03 was followed with an ongoing field evaluation during the 2003-04 winter. An internal report recommended that ADOT continue to use the seven existing systems. ATRC promoted further implementation to ADOT districts at internal and public-partner meetings and conferences. The systems remain in use. There have been no new purchase commitments to date.

SPR-562, *ITS Program Acceptance in Elderly Communities*

Project Cost: $32,500 ($17,500 in ATRC funds and $15,000 from the Maricopa Association of Governments)

Summary: The proportion of the population over 65 is expected to double by 2040. Elderly drivers are an increasing element of the population, and with advanced age come increasing challenges to safe and efficient travel and overall mobility for the individual. As the proportion of elderly citizens increases, it will be important to take advantage of every opportunity to enhance the driving ability of older drivers.

This project investigated the elderly community's reaction to such overall ITS program implementations as ADOT has deployed in the metro Phoenix area—closed circuit television (CCTV) cameras, variable message signs, traffic detection, signal coordination, ramp metering, the national 511 system, and web-based traveler information. If ITS is planned and deployed effectively with regard to the concerns and limitations of the elderly drivers, the potential increase in roadway safety could be quite significant.

Implementation: Selected project recommendations were implemented by the ADOT Intermodal Transportation Division (ITD) Transportation Technology Group (TTG) in the State's 511 traveler information dial-up phone service and website (www.az511.com), concurrent with other periodic releases of desired upgrades, both during and following the completion of the work. The research report and follow-ups have been accepted by TTG for ongoing refinements.

SPR-570, *Rural ITS Progress Study – Arizona 2004*

Project Cost: $60,000

Summary: This project evaluated the rural ITS deployments across the state since 1997, for adherence to the Statewide Plan and architectures, and for overall effectiveness and benefits to ADOT. It also investigated special applications of new technologies by individual ADOT Districts, and reported on costs, perceived benefits, and key issues. The work assessed the benefits of rural ITS in Arizona for the public, commercial carriers, and partner agencies including the highway patrol. Applying the key lessons learned from older drivers will also provide improved clarity and comprehension of ITS traveler information for all age groups.

Implementation: The project results are being employed by the Transportation Technology Group to refine the statewide deployment plan and to consider options for improved utilization of resources. Field districts have been advised of relevant new technologies, and business models, for special applications of ITS in the field. A second research phase has been nominated by project stakeholders for possible future funding. The project would assess the latest and best new technologies and business models across the US for several of ADOT's key rural ITS systems.

PLANNING AND ADMINISTRATION

SPR-548, *Uninsured and Underinsured Drivers*

Project Cost: $15,000

Summary: Mandatory vehicle insurance is part of the state's combination of measures aimed at improving highway safety. Insurance rates are directly connected to driving records. A substantial minority of vehicles on the road are either uninsured or underinsured. Ineffective enforcement of the mandatory insurance law, therefore, reduces the safety of our highways and streets. There is a need to explore ways of making the mandatory insurance law more effective in order to make our roads safer.

Implementation: ADOT is considering suggesting legislation to implement some of the recommendations contained in the report.

SPR-560, *Preferred Construction Communication Modalities for ADOT Customers*

Project Cost: $14,820

Summary: This research project was designed to evaluate how well ADOT provides accurate and timely information about ADOT construction projects to its customers. The communication of this information allows customers to make more informed travel decisions, thereby increasing customer satisfaction and decreasing unnecessary travel through construction areas.

The objective was to better understand how customers currently receive and would most prefer to receive their construction communication, and the impact that current and preferred construction communication modalities have on their travel decisions.

Implementation: The recommendations have helped ADOT focus construction communication with customers. The research construction bulletins, and use of the project website, will be continued. Radio and television advertising will be used more selectively. Close coordination with newspapers will be promoted.

SPR-563, *Port Runners - Impact and Solutions*

Project Cost: $11,475

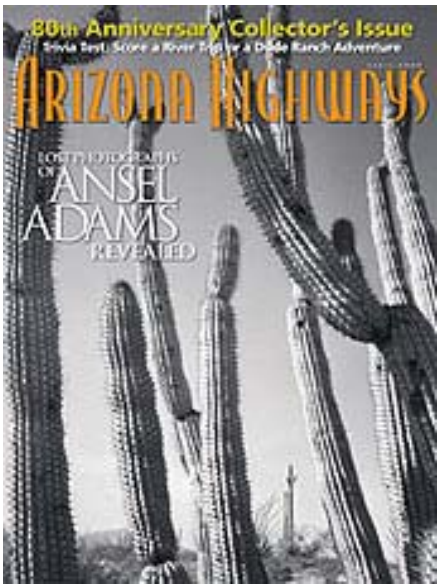
Summary: The purpose of this research was to determine the extent and impact of commercial vehicles that bypass or circumvent the ports of entry (port runners) in order to avoid purchasing the appropriate permits or being cited for non-compliance with weight or registration requirements on roadways and revenues. It was suspected that port runners were often illegal, carrying cargo that exceeds their limits, or drive in excess of the limits set by statute. This affects Arizona highways due to the increased damage incurred by overweight vehicles, decreases the safety of the motoring public due to potentially unsafe vehicles or drivers' reduced capacity. The study developed recommendations related to port operations. The recommendations included operational, structural, and business related strategies.

Implementation: Some of the study recommendations are being implemented. Funding has been allocated to extend the hours of operation at selected interstate ports. A select number of ports are currently in the process of redesign and this will include increasing queue lengths. Other recommendations, such as coordinating electronic screening and weigh-in-motion equipment will require further study and evaluation.

SPR-568, *Arizona Highways Magazine's Impact on Tourism*

Project Cost: $16,000

Summary: *Arizona Highways Magazine*, which is part of ADOT, is a world-renowned travel publication. Anecdotal data from the Arizona Office of Tourism coupled with data from subscriber research suggests the magazine is annually responsible for over $300 million in tourist revenue (not counting direct revenue from subscribers and sales of related products such as calendars, books and general merchandise). The study was designed to more formally quantify this number in order to better understand the dynamics between the magazine, its related products' revenue and tourism revenue.



Implementation: The magazine's economic impact as validated in this research will be a major element in the promotional planning in support of the magazine's 80th anniversary activities and events in 2005. Further, a summarized version of the data will be included in all press releases for at least the next three years. Finally, a separate promotional campaign will be launched to underscore the economic importance of the magazine to the rural areas of the state that are unable to afford their own promotional efforts. This will maximize the magazine's impact on boosting tourist revenue for the state of Arizona and build the case for using some of this revenue for highway improvements.

Appendix A

List of Projects Completed During 2004

Project No.	Project Title
SPR-439	*Pasco Digitization*
SPR-451	*Pavement Marking and Signing Database*
SPR-519	*PM-10 Research for Dust Mitigation*
SPR-535	*Safety Information Exchange System for the Nogales Port of Entry*
SPR-543	*Strategies to Integrate Environmental Stewardship into ADOT's Business*
SPR-545	*Roundabout Evaluation*
SPR-546	*Driver Education Impact on Safety*
SPR-548	*Uninsured and Underinsured Drivers*
SPR-549	*Options for Improving Compliance with Vehicle Registration Laws*
SPR-551	*Speed Limit Study*
SPR-552	*Options for Improving HOV Lane Enforcement*
SPR-560	*Improving Construction Communication with ADOT Customers*
SPR-561	*Transportation Communications: Phase 1- Needs Assessment*
SPR-562	*ITS Acceptance in the Elderly Community*
SPR-566	*Alternate Modes as an Air Quality Mitigation Strategy*
SPR-567	*Remedies for Driver Error*
SPR-568	*Arizona Highways Magazine's Impact on Tourism*

Research: The relentless pursuit of excellence.

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